

SCIENTIFIC LETTERS

Characteristics of poisoning in tourists vs the non-tourist population in a university hospital

*Características de las intoxicaciones en turistas en comparación con la población no turista atendidas en un hospital universitario*August Supervía^{1,3}, Núria León⁴, Mónica Marín^{2,3,5}, Carmen Petrus¹, Oriol Pallàs^{1,2}, María Jesús López Casanova^{1,2,5}

Acute poisonings encompass a broad clinical spectrum determined by characteristics of the poisoned patient, the type of toxic substance involved, the intent underlying the poisoning, and the setting in which it occurs.¹⁻⁴ No studies have specifically assessed differences in the characteristics of poisonings between residents and tourists. The aim of this study was to compare the characteristics of poisonings among tourists with those occurring in the non-tourist population. Additionally, differences within the tourist population according to the sex of the poisoned patient were assessed.

We conducted a retrospective study of poisonings treated in the emergency department (ED) of a university hospital in Barcelona (Catalonia, Spain), serving a reference population of 300,000 people and located in an area with a high level of tourist activity, during 2022–2023. Demographic data and information related to the poisoning episode were collected. Patients were divided into tourists and non-tourists. A patient was defined as a tourist when visiting the city on vacation for a period not exceeding 1 month.

The diagnosis of poisoning was established after review of each case on the basis of clinical and laboratory data and toxicological testing when requested. The hospital has authorization from the Ethics Committee (No. 2014/5658/I) to study the epidemiology of poisonings treated in the ED.

Statistical analysis was performed using SPSS version 28.0. Student's t test or the Mann–Whitney U test was used to compare quantitative variables, and the chi-square test with Pearson correction or Fisher's exact test, when appropriate, was used to compare proportions. *P* values < .05 were considered statistically significant.

During the study period, a total of 1,584 poisoning episodes were treated (226 in tourists). Tourist status could not be determined in 14 patients; therefore, 1,570 poisoning episodes were ultimately included (1,344 in non-tourists). Tourists were younger (27 vs 38 years; *P* < .001) and included a lower percentage of men (52.7% vs 66.8%; *P* < .001).

Among tourists, patients from Western Europe (54%) and North America (13.4%) predominated, whereas among non-tourists, Spanish (49.6%) and North African patients from the Maghreb (18.8%) predominated. Recreational intent (80.1% vs 61.5%; *P* < .001) and poisoning occurring in a public place (93.4% vs 67.2%; *P* < .001) were more frequent among tourists (Table 1).

The toxic substance most frequently involved was ethanol, particularly among tourists (76.1% vs 58.7%; *P* < .001). Tourists had fewer poisonings involving cocaine and heroin (18.1% vs 26.9%; *P* = .005 and 4% vs 8.5%; *P* = .002, respec-

tively) and drugs (8.8% vs 33.6%; *P* < .001). Antidotes were administered to 16% of tourists and 31.5% of non-tourists (*P* < .001). Flumazenil was administered to 6.2% of tourists and 13.2% of non-tourists (*P* = .003), and naloxone to 2.2% and 9.4%, respectively (*P* < .001). A higher percentage of tourists could be discharged after < 12 hours of observation (89.4% vs 68.0%). No deaths attributable to the poisoning episode occurred among tourists (Table 2).

Within the tourist group, women were younger than men (24 vs 29 years; *P* < .001). Among men, a higher percentage of patients came from

Table 1. Baseline characteristics

	Tourist N = 226 n (%)	Non-tourist N = 1.344 n (%)	<i>P</i> value
Age [mean (SD)]	27 (10)	38 (16)	< .001
Sex			< .001
Men	119 (52.7)	898 (66.8)	
Women	107 (47.3)	446 (33.2)	
Region of origin			< .001
Spain	5 (2.2)	666 (49.6)	
Western Europe	121 (54)	82 (6.1)	
Eastern Europe	26 (11.6)	123 (9.2)	
Asia	7 (3.1)	55 (4.1)	
North Africa	10 (4.5)	252 (18.8)	
Sub-Saharan Africa	0	19 (1.4)	
Latin America	15 (6.7)	145 (10.8)	
North America	30 (13.4)	0	
Australia and New Zealand	10 (4.5)	0	
Mode of arrival			< .001
Own means	69 (30.5)	174 (12.9)	
Emergency Medical Services	111 (49.1)	788 (58.6)	
Other/unknown	46 (20.3)	382 (28.4)	
Intent			< .001
Recreational	181 (80.1)	827 (61.5)	
Accidental	19 (8.4)	289 (21.5)	
Suicidal	23 (10.2)	221 (16.4)	
Criminal	3 (1.3)	7 (0.5)	
Location			< .001
Home	9 (4)	372 (27.7)	
Public place	211 (93.4)	903 (67.2)	
Unknown/other	6 (2.6)	69 (5.1)	
Previous poisonings	18 (8)	596 (44.3)	< .001
Psychiatric history	19 (8.4)	576 (42.9)	< .001
Psychiatric consultation	12 (5.3)	260 (19.3)	< .001
Judicial report	53 (23.5)	360 (26.8)	.292

Values in bold denote statistical significance (*P* < .05).

Table 2. Toxic substance involved, treatment administered, and patient disposition

	Tourist N = 226 n (%)	Non-tourist N = 1.344 n (%)	P value
Ethanol	172 (76.1)	782 (58.7)	< .001
Drugs of abuse			
Total*	99 (43.8)	585 (43.6)	.945
Cocaine	41 (18.1)	361 (26.9)	.005
Heroin	9 (4)	114 (8.5)	.020
Cannabis	32 (14.2)	200 (14.9)	.774
Ecstasy	11 (4.9)	89 (6.6)	.316
Amphetamines	13 (5.8)	125 (9.3)	.081
GHB	12 (5.3)	61 (4.5)	.612
Methadone	2 (0.9)	50 (3.7)	.025
Unidentified	14 (6.2)	48 (3.6)	.061
Other	6 (3.5)	25 (1.9)	.437
Drugs			
Total*	20 (8.8)	452 (33.6)	< .001
Benzodiazepines	16 (7.1)	362 (26.9)	< .001
Antipsychotics	6 (2.7)	172 (12.8)	< .001
Antidepressants	0	61 (4.5)	< .001
Lithium	0	17 (1.3)	.07
Opioids	0	39 (2.9)	.002
Paracetamol	1 (0.4)	21 (1.6)	.152
NSAIDs	0	10 (0.7)	.210
Digoxin	0	13 (1.0)	.131
Antihypertensive drugs	0	2 (0.1)	.733
Antiepileptic drugs	0	6 (1.1)	.096
Hypoglycemic agents	1 (0.7)	4 (0.4)	.393
Treatment			
Antidote use	36 (16)	421 (31.5)	< .001
Flumazenil	14 (6.2)	177 (13.2)	.003
Naloxone	5 (2.2)	127 (9.4)	< .001
GI decontamination	0	53 (3.9)	< .001
Renal/extrarenal elimination	0	11 (0.8)	.181
Hyperbaric chamber	0	31 (2.3)	.198
Disposition			< .001
Discharge < 12 hours	202 (89.4)	914 (68.0)	
Discharge > 12 hours	18 (8.0)	311 (23.2)	
Admission to hospital ward	0	26 (1.9)	
Admission to intensive care unit	5 (2.2)	50 (3.7)	
Admission to psychiatry	1 (0.4)	18 (1.3)	
Transfer/other	0	25 (1.9)	
Discharge against medical advice	13 (5.8)	71 (5.3)	.772
Elopement	55 (24.3)	326 (24.4)	.919
Deaths	0	8 (0.6)	.288

*The sum of cases for the toxic substances involved does not equal the total number of patients because some patients had poisoning involving > 1 drug of abuse or > 1 drug.

NSAIDs: nonsteroidal anti-inflammatory drugs; GHB: gamma-hydroxybutyrate.

Values in bold denote statistical significance ($P < .05$).

Eastern European countries, Asia, and the Maghreb. Women had a higher percentage of ethanol poisoning (88.8% vs 64.7%; $P < .001$) and lower percentages of poisoning involving drugs of abuse (35.5% vs 51.3%; $P = .017$) and drugs (4.7% vs 12.6%; $P = .036$). Furthermore, flumazenil was used less frequently (2.8% vs 9.3%; $P = .054$), and naloxone was not used. Women required > 12 hours of observation less frequently (2.8% vs 12.6%; $P = .046$) (Table 3).

This study shows that the characteristics of poisoning differ between

tourists and residents. Moreover, differences were observed among tourists according to the sex of the poisoned patient. A former study showed that, in cities with a high tourist burden, there was less variation in the number of ED visits according to whether the day was a working day or a holiday,⁵ which is to be expected because such distinctions are less relevant during vacation periods. Our study additionally shows that tourists treated for poisoning are younger and that, although men predominate, the sex

distribution is more balanced than among non-tourist patients. This is probably related to the higher proportion of recreational poisonings among tourists, which exceeded 80%.

The drugs of abuse most frequently involved among tourists were ethanol, cocaine, and THC (tetrahydrocannabinol). Cocaine poisoning was less frequent and ethanol poisoning more frequent—with ethanol involved in more than three quarters of tourist patients—than among residents. In addition, although a higher percentage of unidentified substance use was observed, this difference did not reach statistical significance. These substances probably included cathinones and semisynthetic cannabinoids, which are emerging substances,^{6,7} but they could not be identified because the hospital laboratory lacked techniques for their detection. Drug poisonings were less frequent among tourists, consistent with the lower proportion of accidental poisonings or poisonings with suicidal intent. Nevertheless, 3 cases involving criminal intent were identified, all in women, 2 of which involved suspected drug-facilitated crime. It is known that a substantial proportion of victims of drug-facilitated crime are non-Spanish patients, regardless of whether an associated criminal offence can ultimately be identified,^{8,9} as occurred in the 2 patients with suspected drug-facilitated crime in this series.

Sex-related differences among tourists showed that women were younger and that cocaine, heroin, GHB (gamma-hydroxybutyrate), and benzodiazepines were less frequently involved, whereas ethanol poisoning (close to 90%) and cannabis involvement were more frequent. These findings are similar to those of a recent Spanish study in which women had a higher proportion of poisonings involving ethanol and cannabis.¹⁰ In contrast, another study found that women experienced fewer poisonings involving drugs of abuse, including cocaine, with no differences in ethanol poisoning.¹¹

This study has several limitations. Its retrospective, single-center design limits its external validity. Similarly, the method used to identify the toxic substances involved, based on the clinical history or analytical methods, has limitations.¹² However, this does

Table 3. Characteristics of poisonings among tourists according to sex

	Men N = 119 n (%)	Women N = 107 n (%)	P value
Age [mean (SD)]	29 (11.2)	24 (7.3)	< .001
Region of origin			.897
Spain	3 (2.5)	2 (1.9)	
Western Europe	55 (46.6)	66 (62.3)	
Eastern Europe	21 (17.8)	58 (4.7)	
Asia	5 (4.2)	2 (1.9)	
North Africa	9 (7.6)	1 (0.9)	
Latin America	8 (6.8)	7 (6.6)	
North America	118 (9.3)	19 (17.9)	
Australia and New Zealand	6 (5.1)	4 (17.9)	
Not recorded	1 (0.8)	1 (0.9)	
Previous poisonings	14 (11.8)	4 (3.7)	.028
Psychiatric history	10 (8.4)	9 (8.4)	1.000
Psychiatric consultation	8 (6.7)	4 (3.7)	.383
Mode of arrival			.777
Ambulance	64 (53.8)	47 (54.7)	
Own means	34 (28.6)	35 (40.7)	
Other/no data	21 (17.6)	25 (23.4)	
Location of poisoning			.413
Home	7 (5.9)	2 (1.9)	
Street or public place	108 (90.8)	103 (96.3)	
Other/not recorded	4 (3.4)	2 (1.2)	
Type of poisoning			.459
Recreational	99 (83.2)	82 (76.6)	
Suicidal	9 (7.6)	14 (13.1)	
Accidental	11 (9.2)	8 (7.5)	
Criminal	0	3 (2.8)	
Type of toxic substance			
Alcohol	77 (64.7)	95 (88.8)	< .001
Drugs	15 (12.6)	5 (4.7)	.036
Drugs of abuse	61 (51.3)	38 (35.5)	.017
Chemical products	1 (0.8)	1 (0.9)	1.000
Other			
Treatment			
Antidote use	21 (17.8)	15 (14.0)	.440
Flumazenil	11 (9.3)	3 (2.8)	.054
Naloxone	5 (4.2)	0	.061
Disposition			.046
Discharge < 12 hours	100 (84.0)	102 (95.3)	
Discharge > 12 hours	15 (12.6)	3 (2.8)	
Admission to intensive care unit	3 (2.5)	2 (1.9)	
Admission to hospital ward	0	0	
Admission to psychiatry	1 (0.4)	0	
Discharge against medical advice	7 (5.9)	6 (5.6)	.929
Elopement	25 (21.0)	30 (28.0)	.219
Death during the episode	0	0	No procede
Judicial report	28 (23.5)	25 (23.4)	.977

The sum of cases involving toxic substances does not equal the total number of patients because some patients had poisoning involving more than one drug of abuse or more than one medication. Values in bold denote statistical significance ($P < .05$).

not detract from the validity of the study, as it reflects routine clinical practice, in which the etiological diagnosis of poisoning—particularly when illegal drug use is suspected—is predominantly based on the medical history and urine drug testing using nonconfirmatory methods. Furthermore, the number of patients included supports the validity of the

results obtained and allows differences between tourist and non-tourist patients to be identified.

In conclusion, in the catchment area studied, poisonings among tourists accounted for 14.3% of all poisoning episodes. Tourists with poisoning were younger, and their sex distribution was more balanced than that of non-tourist patients. The

most common regions of origin were Western Europe and North America. Poisonings generally occurred in public places, were predominantly recreational in intent, particularly involved ethanol, and required antidote administration less frequently. In addition, ethanol poisoning accounted for a very high proportion of cases among female tourists, whereas male tourists had greater use of illegal substances.

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